

CLAIMS

1. A visual display system comprising:
a display light source that transmits an image in at least partially polarized light; and
5 a combiner that transmits light from a field of vision behind the combiner to a viewer in front of the combiner, the combiner
reflecting a first portion of the light to superimpose the image as a virtual image within the transmitted field of vision,
rotating the polarization of a second portion of the light, and
10 transmitting the second portion of the light, the second portion of the light therefore having low efficiency for reflection towards the viewer from optical boundaries encountered by the second portion of the light following rotation of the plane of polarization by the combiner.
- 15 2. The visual display system of claim 1 wherein the light is *s*-polarized, and the polarization of the light is rotated by the combiner to produce *p*-polarized light.
3. The visual display system of claim 1 wherein the combiner consists of a birefringent material.
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4. The visual display system of claim 1 wherein the combiner is coated with a birefringent film.
5. The visual display system of claim 1 wherein the combiner is coated with a dielectric film.
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6. The visual display system of claim 1 wherein the combiner is coated with a metallic film.
- 30 7. The visual display system of claim 1 used in a head-up display, providing a primary virtual image of an automotive gauge with only attenuated ghost images.
8. The visual display system of claim 1 used in a head-up display, providing a primary virtual image of an automotive gauge with no ghost images.
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9. The visual display system of claim 1 used in an application selected from among:

a speech prompt display;
 a see-through projection display; and
 a head-up display in a vehicle.

5 10. The visual display system of claim 1 further including a relay optic that rotates the polarization of the reflected, first portion of the light.

11. The visual display system of claim 10 used in a head-up display to allow a viewer to wear *p*-polarized sunglasses.

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12. The visual display system wherein the display light source is selected from among:
 a display projection system utilizing a light guide, diffuser, liquid crystal display, and transmitting window;

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a vacuum fluorescent display;
 a laser or light emitting diode combined with a scanning mirror;
 a laser or light emitting diode combined with a number of lasers, LEDs, and scanning mirrors;
 a laser or LED combined with scanning lenses; and
 an array of LEDs that together compose a graphical or textual display.

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13. A visual display system comprising:
 a display light source that transmits an image in an at least partially *p*-polarized light;
 and

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a combiner, coated with a metallic coating, that transmits light from a field of vision behind the combiner to a viewer in front of the combiner, the combiner
 reflecting a first portion of the light to superimpose the image as a virtual image within the transmitted field of vision, and

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transmitting the second portion of the light, the second portion of the light having low efficiency for reflection towards the viewer from optical boundaries encountered by the second portion of the light following transmission into the combiner.

14. The visual display system of claim 11 used in a head-up display to allow a viewer to wear *p*-polarized sunglasses.

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15. A method for superimposing a virtual image within a field of vision, the method comprising:

transmitting an image in an at least partially polarized light from a display light source;

transmitting light from a field of vision behind a combiner to a viewer in front of the combiner;

5 reflecting a first portion of the light from the combiner to superimpose the image as a virtual image within the transmitted field of vision;

rotating the polarization of a second portion of the light within the combiner; and

transmitting the second portion of the light through the combiner.

10 16. The method of claim 14 employed to provide a head-up display.

17. The method of claim 14 employed to provide a see-through display projector.

18. The method of claim 14 employed to provide a speech-prompt display.